that is to say, the losses by radiation are peculiar to each type and size of furnace.[1]

(6) The ability of the body being heated to absorb heat from the hot gases and by radiation. This may be generalized in the following statement:

Assuming that one reheating furnace is charged with cold ingots and another with hot ingots, it is very evident that these two furnaces will work in different fashions. The drop in temperature of the hot gases in the first of these furnaces will be much greater than it will be in the second furnace. Accordingly, in the first furnace the time during which the hot gases remain in the heating chamber should be diminished and the volume of the gases per second should be increased. It is therefore necessary that the dimensions of the heating chamber and the size of the ports should be designed and constructed to conform to these conditions.

Similar differences will exist in furnaces designed for the production of different outputs. Consider, for example, a rolling mill and a reheating furnace to serve the mill. It is evident that the operation of the furnace must be regulated to suit the output of the rolling mill, that is, when the mill is working fast and without interruptions of output, it will be necessary to heat fast and, accordingly, to decrease the time during which the hot gases remain in the furnace. On the contrary, if the work of the mill is subject to interruptions, the time during which the hot gases remain in the heating chamber will be increased and the output of the furnace will accordingly be decreased.

The foregoing shows the importance of some of the factors which have to be established, and it is desirable that the value of these factors should be based upon furnaces actually in service, by accurate determinations of the drop in temperature of the gases in the heating chamber per second. These values are of

primary importance in the design computations for furnaces.

Therefore, according to the operating conditions of the furnace whose design is to be established, the following order of procedure is observed:

1. The necessary volume of the heating chamber is computed.
2. The volume of gases obtained per kilogram of combustible

(1) *Note by translator.*—The exposure of the furnace to air currents and the convection currents arising from the hot walls must be taken into considera-